Please refer for the installation to the SMS FoxBox "Getting started", downloadable here.

When you encounter this symbol, it means that there is an updated example on this website. Just follow the link to open it.

USER GUIDE

SMS/MMS FoxBox G20

Version 2.1

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1.0 Introduction

SMS FoxBox is a compact and low cost solution to send and receive SMS messages using a normal SIM card. It includes a GSM quad band modem, a microSD memory card to store the messages (up to 2 millions with the default 2GB card) and a Unix system to manage the SMS queue through an easy to use Web interface.

SMS FoxBox can also operate as an SMS to TCP/IP gateway, integrating a wide range of network and desktop applications with the SMS messaging.

1.1. How to connect to SMS FoxBox

SMS FoxBox is fully Web based. This means that you have to use a Web browser (capable of XSL transformations) to interact with it. Supported browsers are:

- Mozilla Firefox (recommended)
- Netscape
- Opera
- Internet Explorer 6
- Google Chrome

For a better experience we suggest you Mozilla Firefox, available for download here.

The default IP address is 192.168.0.98.
Typing it on the address bar of the browser takes you to the Web interface, where you can log in with:
- username: admin
- password: admin

The system is case-sensitive, and it checks capital letters. Be sure to write the credentials in the right way.

For TTY or SSH access the account is:
- username: root
- password: foxboxg20

2.0 Control Functions

2.1 CONTROL PANEL

From this window you can control the status and get access to the core of the system. A set of utilities for diagnostic is available on the bottom of the page. The console is organized in 2 frames:

2.1.1 STATUS

- SMS engine: This button is used to control the main SMS engine. This is enabled by default and gives to the system the power of “send messages” and “receive messages”. Stopping the engine will immediately hang the machine, so all processes of sending and receiving will be halted. Clicking on the name, you will access its configuration page. Remember that every setting modified on this configuration requires that the engine will be restarted to take effect.
- SMS gateway: This button controls the email to SMS gateway engine (procmail + fetchmail). Clicking on the name, you will access its configuration page. Also here you need to restart engine to obtain the changes.
- Modem: start and stop the GSM/GPRS internal modem. This control automatically starts and stops the SMS engine. From this menu you can send AT commands to the internal modem and view the output. This is really usefull for country code settings and internal configuration. You can also start a voice call with ATDXXXPHONE where XXXPHONE is the number you like to DIAL.
- Buzzer: Acustic beep on incoming message.
- Signal quality: This is the air carrier signal indicator. It can be in one of this 4 positions:
    - No signal: There is no signal, please check your antenna.
    - Low: The signal is low, if possibile try to move your GSM antenna in a better position.
    - Good: The signal is good, the antenna is in a good position and the box operations are normal

- Very Good: The signal is excellent.

2.1.2 UTILITIES

- Black/White list: In the provided text fields you can specify both:
    1. Blacklist: Phone numbers listed here are “banned” and sending SMS will be disabled. All numbers should be entered followed by a carriage return. To enable this feature you have to remove the sharp symbol # from the line “#blacklist=/mnt/flash/…” in the SMS engine configuration.
    2. Whitelist: This features gives you the ability to allow SMS sending only to number specified in the list. To enable this feature you have to remove the sharp symbol # from the line # “#whitelist=/mnt/flash/…” in the SMS engine configuration.

Note that an SMS engine restart is needed only on first activation, numbers will be listed and de-listed on the fly (Rif 5.0.3 How to enable BLACK/WHITE list).

- Backup/Restore: This utility was designed to allow you to backup the whole content of the appliance (DB and Configuration) in a copressed format. The restore process will push all contents to their original locations. This allows an easy settings migration from a device to another.

3.0 Messages Management

3.1 Incoming Messages

In this page are listed all incoming messages for the user's queue (Rif. 4.1 Users management).

Each SMS message is indexed by the system for easy search capabilities, and has these fields:

- From: the SMS sender;
- From_SMSC: the Short Message Service Center (SMSC);
- Sent: Date and time of the SMS message;
- Received: Date and time the message was received by the system;
- Subject: Logical name of the modem device receiving the message (GSM1 is internal GM862-quad);
- Alphabet: is the alphabet used to encode the message;
- Text of the SMS message.

The system wil receive messages in background, the number of new received messages is notificated trough a counter displayed on the right menu. For “How to disable SMS receiving” refer to the SMS engine configuration (Rif 5.0 How to configure the SMS engine).

The main queue linked to users of level Operator and Viewer is named "default", if you would like to link users to different queues look to the Users Management (Rif 4.1 users Management). Instead, Admin users works on the queue “history”.

3.2 Sent Messages

In this page are listed all sent SMS messages.

3.3 Outgoing Messages

In this page are listed all messages in queue, during the “sending phase” but not

already charged by the modem.

3.4 Failed Messages

In this page are listed all SMS messages skipped for errors after 3 send attempts.

3.5 New message

From here you can send new SMS messages.
You have to insert the required data filling the form:

- From: by default the user logged in the web interface
- To: Receivers phone number in international format without the leading +. for example 39XXXXXXXXX, or select a contact or a list of contacts from the Address book (Rif 3.7 Address Book).
- Message: Type the text of the message, if autosplit is enabled (default), you can send up to 1836 characters as concatenated SMS (Rif 5.2 Autosplit).
- Flash: the message appears directly on the phones display. Most phones support this feature, but not all.

3.6 Polls

Polls are a simple way to obtain fast and custom statistics on SMS content of incoming messages. This function allows you to specify a list of patterns. Every time an SMS message contains one of this patterns, the counter for the poll is incremented and a graphic with percentage is displayed. To add/remove pattern subjects simply click on add or remove.

3.7 Address Book

List of contacts and groups for distribution lists.
From here you can choose between:

- Add a new contact;

- Select single and multiple contacts;
- Delete a contact;
- Edit contact;
- Search.

For each entry you have:

- Name: contact name;
- Phone: phone number of the contact number, in international format without the leading +. For example 39XXXXXXXXX;
- Group/notes: Used to identify a group for multiple sends and distribution lists;
- How many times: how many times every message will be sent to the contact.

To add a contact to the Address Book select "add" from the menu.
To send a message to a single contact click on his name, automatically the phone number will populate the "To" field of the send message form.

3.7.1 Distribution lists and multiple send *

For multiple send or Distribution lists you have to launch a search matching the group/notes fields*. After you have obtained the desired list, click on “send to all” to start messages sending process. In the page “Send new message", in the "To" field the tag [selected group] wil be displayed to show this feature is active.

4.0 SYSTEM MANAGEMENT

4.1 Users management

SMS FoxBox is a multi-users system with access privileges.
With “Users management” you can configure users and grant to each one a dedicated incoming message queue. The Admin user is a “power user”, it can perform every settings of the box and create other users. Then we have other two levels: the Operator (with no setup capabilities) and the Viewer (can only view incoming messages and perform base operations).
For each user the Admin should specify a different incoming queue, so new users will work on a dedicated environment without interfer with others, or link it to the default queue shared by other users. Only the Admin can access historical queue (where all incoming messages are stored).
Users attributes are:

- Name: username for login
- Password: password
- Type: level of the user (Admin, Operator, Viewer)
- Queue: queue space definition.

The users access level (privileges) are:

- Operator: can handle incoming and outgoing messages, send new messages but cannot change configurations.
- Viewer: is a “read-only” user and can only view incoming messages and send messages as defined in black/white lists.

If you have defined a custom queue for a user and you delete it you will delete also the associated database, only the default and the historical queues cannot be deleted.

4.2 Configuration

This layout gives you the full control on graphic template, language selection and on gateway "Email to SMS" and "SMS to Email" functions.

- **4.2.1 Configure the SMS to Email forward:** From here you can specify the SMTP server for SMS forwarding to a Mailbox.

- Insert sender domain: Specify the domain from where messages should be sent, for example if you mailbox is mike@gmail.com the domain is the text portion after the @, so it will be gmail.com.
- SMTP server for outgoing mails: insert the IP or the fully qualified domain name of your SMTP server.
- From which address the appliance has to send: this will be the email address from where SMS FoxBox will send messages.
- Destinations: insert the email address where the SMS message should be forwarded. If you need to send it to more than one mailbox, insert them separated by a comma.
- Custom subject: insert the subject of the email that will be sent to you (Example "New SMS for you").

To enable this feature you have to remove the sharp # in the Event Handler (Rif 4.3.4 How to enable the SMS gateway).

- **4.2.2 Template configuration:** From here you can customize the theme of your box, change the language, apply your logo and company name.

- Company logo (80x50): Upload an image in jpeg format, this will substitute the SMS FoxBox logo. The image should be sized 80x50pixel
- Template: Choose the theme of you FoxBox from the popup
- Language: choose the interface language.

- **4.2.3 How to setup the Email to SMS forward:** The function “forwarding” of Email to SMS offers you the opportunity to divert all incoming e-mail messages of a defined mailbox to the phone number specified in the from, in the body or in the subject of the

email. Look at http://www.kdev.it/joomla/SMS_FoxBox/Tutorials/Email_to_SMS_custom_scripts_20070822269.html for customization tips.

Fields you need to configure are:

- Specify server to poll: specify the fully qualified domain name or the IP of the server where the mailbox is hosted;
- Specify protocol: select wich protocol should be used (POP3 or IMAP);
- Insert username: type here the username used to log into the mailbox;
- Password: type here the password used to log into the mailbox;
- If you check "Keep messages on the server", your messages will not be deleted from the mailserver when diverted.

To enable this function you have to Start the "Gateway engine" from Control Panel. (Rif 2.1.1 SMS gateway engine)

When the configuration is finished, you can try the divert feature following this example:

You would like to send the text "test divert" to the phone number 349000111222.
Open up your favourite email client and format the message as follows:
Fill the "to:" field with the email address defined for divert.
Please, check that the email format is configured as TEXT and NOT as HTML.

In the e-mail subject type: TOsms
In the body of the email:
From: your name
To: 39349000111222

test divert to the phone number

and then send the e-mail, in a few seconds the message will be sent to the desired number.

This feature is really useful for those who wants to give to their diagnostic systems (email based) a notification through SMS.

The configuration file for procmail is located in /etc/.procmailrc, feel free to modify it to fit your needs.

4.3 Event Handler

The eventhandler is one of the powerful features of SMS FoxBox. From here, you have full control on all actions that SMS FoxBox performs to receiving or sending a message. You can assign different meanings to leds, disable incoming messages or disable outgoing messages and a lot of other things.

To activate or deactivate functionalities you need only to uncomment or comment the little blocks enclosed between # (sharp symbol).

Take a look to the block that calls custom scripts on incoming messages. Uncommenting it as shown below, you will activate the custom form of the case 1.
As you can see, in this if-clause the RECEIVED event is selected (events you can select are: SENT, RECEIVED, FAILED or REPORT).
You have to keep in mind that you need to pass arguments to the script you want to run:

Arguments you can pass are:
* $1: Is the event identification and should be SENT, RECEIVED, FAILED or REPORT
* $2: Is the full path to the SMS file handled by event in $1
* $3: is the message id of the SENT message, it is only used if you sent a message successfully with status report enabled.

With the word “event” we identify an action, the available events are Incoming Message “RECEIVED”, Sent Message “SENT”, e Failed Message “FAILED”.
The form allows you to edit the script following BASH syntax, removing # from a block you activate the function, or adding a script to customize the SMS FoxBox.

Each time that an event occurs the eventhandler is invoked, and all the variables ($1,$2) passed to this script, that will execute the action defined in the if-clauses.

Predefined eventhandler blocks :

4.3.1 Control a LED for a visual alarm

TURN ON LED OG29 ON RECEIVED MESSAGE
#if ["$1" = "RECEIVED"]; then
#/etc/sms/scripts/led29
#fi
#
If you enable this block, for each incoming message you'll obtain a blink of the LED OG29 (Rif Hardware reference)

TURN ON OG 29 ON SENT MESSAGE
#if ["$1" = "SENT"]; then
#/etc/sms/scripts/led29
#fi
#
If you enable this block, for each outgoing message you'll obtain a blink of the LED OG29 (Rif Hardware reference)

4.3.2 How to enable a application

#Enable this to activate custom events
#This is the custom script written by user for RX action
#
#if ["$1" = "RECEIVED"]; then
#/mnt/flash/root/source/custom/custom_rx "$2"
#fi
#
#This is the custom script written by user for TX action
#if ["$1" = "SENT"]; then
#/mnt/flash/root/source/custom/custom_tx "$2"
#fi

This block contains the call to the scripts handled by Custom Application for RX (incoming) messages (Rif 4.4 Custom Application).

4.3.3 How to enable XML format

#Save messages in XML format
#if ["$1" = "RECEIVED"]; then
#/etc/sms/scripts/sms2xml $1 $2 $3
#fi
#
With the activation of the block all incoming messages will be exported in XML format and saved in the defined folder.

BASE functions for incoming and outgoing messages DEFAULT
#NEVER DISABLE THE FOLLOWING SCRIPT FOR MESSAGE RECEIVING
if ["$1" = "RECEIVED"]; then
/etc/sms/scripts/parser.php
fi
#
This block should always be active, if you disable it, incoming messages will not be visibles from the web interface.

#
#NEVER DISABLE THE FOLLOWING SCRIPT FOR MESSAGE OUTGOING
if ["$1" = "SENT"]; then
#
#/etc/sms/scripts/out.php
/etc/smsc_ctl $2
fi
#
This block should always be active, if you disable it, outgoing messages will not be visibles from the web interface.

```
#Event on failed message
if [ "$1" = "FAILED" ]; then
/etc/sms_fail $2
fi
```

This block should always be active, if you disable it, failed messages will not be visibles from the web interface.

4.3.4 How to enable the SMS gateway functions (SMS to Email)

```
#SMS TO EMAIL
#
#/etc/mailsend/smstomail "$2" "$1"
#fi
#
#Event on sent message
#if [ "$1" = "SENT" ]; then
#/etc/mailsend/smstomail "$2" "$1"
#fi
#
#Event on failed message
#if [ "$1" = "FAILED" ]; then
#this send the failed message to a mail address
#/etc/mailsend/smsfailmail "$2" "$1"
#fi
#
```

This block enables the SMS to email forward functionality for INCOMING, OUTGOING and FAILED messages as declared in the variable $1 (RIF 4.2.1 How to configure the forward SMS to Email)

4.3.5 How to enable MySMS module (automatic Mysql insert)

#this is the database mysql backend

#if ["$1" = "RECEIVED"]; then

#/etc/sms/scripts/mysmsd "$1" "$2" "$3"

#fi

This block enables the MySQL module as described in (Rif 4.5 MySMS Module)

4.4 Custom Applications

- Custom application forms and eventhandler
- How to join SMS to your server environment

From this panel you can extend SMS FoxBox functions with your own applications.
In the two text fields you can link your program to INCOMING (Rif 4.3 Event Handler), RECEIVED or SENT messages.
By default the system is configured for executing a BASH script in shell #!/bin/sh. If you would like to use PHP scripting simply change the header declaration with #!/bin/php .
Obvously you can also write C or C++ applications and run it from here, for a complete guide to write applications for Fox Board look at http://www.acmesystems.it where the SDK and a WebCompiler are available.

4.4.1 Example of contest via SMS

- **Example of SMS FoxBox application**

Now is time to proceed with a practical example, we would like to create a game, a little example of Lottery.
We would like that people send SMS messages to the number of SMS FoxBox typing in the text a CODE, and we want to answer to the winner with an SMS notification.

Analysis of the problem:

To create this application we need to control the text of each incoming message. In case

the message has the winning code, we need to extract the phone number of the winner and send an SMS with the notification to it.

This is a shell script that performs all this actions:

```
#!/bin/sh
#
#This is a sample script for custom RX action
#PURPOSE: The script search a code inside a incoming message and if the code is matched reply
#with the messahe "You WIN!"
#
#Search the code 1223456 inside the SMS message
#
#CODE that we want to search
SEARCH="123456"
#
#Text message that we want to send
TEXT="You WIN!"
#
#
CODE=`/bin/cat $1 | grep "$SEARCH"`
#
#if code is not empty reply with the message "You WIN!"
if [ "$CODE" == "$SEARCH" ]; then
 #I need to extract the phone number to send the reply
 #
 NUMB=`/bin/cat $1 | /bin/grep "From:" | awk '{print $2}'`
 #
 #Now I generate the file for outgoing queue
 FILE=`/bin/mktemp /mnt/flash/spool/outgoing/send_XXXXXX`
 echo "To: $NUMB" >> $FILE
```

```
 echo "" >> $FILE
 echo "$TEXT" >> $FILE
fi
```

To try this script, copy and paste it inside the form "Custom application applied to received items".
Then send a message with this code: "123456" and you will WIN! :-)

As you can see in this example, we have created a little parser using `/bin/cat $1 | grep "$SEARCH"` this means:
list the content of $1 (that is the full path to the received message) and match if it contains the pattern $SEARCH (the winner code).

Then we extract the phone number of the winner with: `/bin/cat $1 | /bin/grep "From:" | awk '{print $2}'`
this means list the content of $1 search the pattern "From:" and take the number using awk {print $2} (column 2).

At the end we proceed generating the notification message. The code below will create a file with this content, the destination To: (previous extracted number) a blank line and the the text of the notification.

```
FILE=`/bin/mktemp /mnt/flash/spool/outgoing/send_XXXXXX`
echo "To: $NUMB" >> $FILE
echo "" >> $FILE
echo "$TEXT" >> $FILE
```

The variable $1 contains the full PATH to the message, and what is the format of the message in this file? It is simply this one:

```
From: Kanta
To: 491721234567
```

Alphabet: ISO
Text of the message:

Please refer to (Rif 4.3.2 Enable an application).

4.5. MySMS module

How to put SMS on Mysql

The SMS Fox Box internal database is SQLite. This engine offers very good performance and supports databases up to 2 terabytes in size.
You would say: "Really good but my system is based on MySQL!", this is not a matter with MySMS module!

The main purpose of this module is grant you the capability to automatically divert all your message to your favourite database.

As all other processes, also this one is controlled by the main eventhandler.
The code below is the call to the module from event handler and it is a portion of it:

```
.....
#this is the database mysql backend
#if [ "$1" = "RECEIVED" ]; then
#/etc/sms/scripts/mysmsd "$1" "$2" "$3"
#fi
....
```

To activate/deactivate the module you have always to remember to remove/add the # (sharp character) as described in the Event Handler how-tos.

The configuration is fully web based, and you can access it by clicking on MySMS button. Below is listed all that you need to get a complete setup:

- A MySQL socket listening on default port on your server with permission setted up to accept incoming connection from the IP of SMS FoxBox;
- The IP/hostname of your MySQL Server;
- The Username to access the table with enough permission to perform SELECT and INSERT;
- The password you setted up for the user, remember to verify password style;
- The name of database where we have to perform the INSERT query;
- You can choose to store messages only on MySQL or on both database (internal SQLite and MySQL).

After you finished filling up required fields choose Save Configuration to apply changes.

Your MySQL Database should contain a table named "messages" with the following fields times,froms,tos,subject,sent,texts.

The insert will populate this fields with time when the message was received by SMS FoxBox, sender phone number, receiver phone numbers, the logical name of the modem that received the message, time when message was sent and the TEXT of the message.

The INSERT is called by a script that "parse" the SMS File for extract values and pass them as arguments at a binary file that perform the real insert. The parser is located in /etc/sms/scripts/mysmsd and the code is reported below:

```
DATE=`date +"%Y-%m-%d %H:%M:%S"`
#Extract data from the SMS file
FROM=`/etc/procmail/formail -zx From: < $2 | sed 's/"//g'`
TO=`/etc/procmail/formail -zx To: < $2`
SUBJECT=`/etc/procmail/formail -zx Subject: < $2`
SENT=`/etc/procmail/formail -zx Sent: < $2`
#Text is not used but could be used
TEXT=`/etc/procmail/formail -I "" <$2`
```

#CALL the binary
/etc/sms/mysms "$DATE" "$FROM" "$TO" "$SUBJECT" "$SENT" "$TEXT"

For the SMS processing we used a PROCMAIL utility called FORMAIL. More info are available on their website.
Pay attention, to use this module you need to activate it into the eventhandler (Rif 4.3.5 How to enable MySMS module).

4.6 Network

From this screen you can edit TCP/IP settings of the SMS FoxBox.

Available fileds are:

- IP address;
- SUBNET MASK;
- BROADCAST address (ex. 192.168.7.255);
- GATEWAY IP for internet access, this should be enabled for the use of SMS forwarding and other network functions (Rif. 4.2 Configuration);
- DNS servers Domain Name Server.

After you have saved the new config you have to reboot the appliance for the changes to take effect.

4.7 Date & Time

SMS handling needs that date and time are correclty setted up, due to the indexing of the messages inside the database.
You can choose to set Date & Time manually or use a network time server with your local time settings.

4.8 System and logs

This is a summary of your system overall status. From here you can see:

- Used RAM memory;
- Used Flash memory;
- System details;
- Handle SQLite databases using the internal manager (as PHPmyAdmin but for SQLite)
- View logs of procmail, sms engine. (Rif 5.1 LOG level and verbosity)

4.9 SMS file format

The SMS file format is a text file composed of two parts:

- The header
- The message

This two parts are separated by a carriage return.

An easy SMS example is:

From: SMSFoxBox
To: 3934947XXX
Alphabet: ISO

Text of the short message

Each Header line has a meaning as shown in the table below:

GENERIC HEADERS

From: sender identification, useful for logged in user identification (outgoing messages);
To: receiver phone numbers, the number should be specified in international format without the +;
Flash: if you set this value to "yes", the message will appear directly on the phone

display without asking for open it up (if supported by mobile phone);

Alphabet: specify the character SET used in the SMS text:

ISO LATIN ANSI: 8 Bit character set, MAX 160 Characters with autosplit (DEFAULT VALUE)

GSM: 7 bit character set refer to GSM specification MAX 160 Characters with autosplit

UCS: UCS2 character set MAX 70 Characters with autosplit

BINARY: 8 bit binary data, no text (ringtones and data trasmission)

SMSC: phone number of the SMSC;

Report: control if a status report is requested for the message, boolean value (yes/no). Default is NO;

Autosplit: control how to split messages. Useful only for text messages, not for binary split.

RECEIVED SMS MESSAGES (Incoming)

From: sender phone number

From_SMSC: the SMSC that sent the message

Subject: the logical name of the modem that received the message (DEFAULT GSM1)

Sent: time when message was sent

Received: time when the message was received by SMS FoxBox

You can use custom header lines for your applications. If the Software finds unknown headers it will simply skip it.

An example of received message is:

From: 3934947032XX

From_SMSC: 39565258552585

Sent: 06-10-04 23:26:23

Received: 06-10-04 23:26:29

Subject: GSM1

Alphabet: ISO

Text of the short message

An example of outgoing message is:

From: SMSFoxBox

To: 3934947XXX

Alphabet: ISO

Text of the short message

5.0 SMS engine configuration

As shown in (Rif 2.1.1 Control Panel), by clicking on "SMS engine" you'll get access to the configuration panel of the core engine for incoming/outgoing SMS.
Here you can configure some priority settings:

Incoming: Enables the SMS receiving capability

0: Disabled

1: Enabled

2: Enabled with maximum priority to incoming messages

5.1 LOG LEVEL (Verbosity)

loglevel = <value>
This gives you control to the log verbosity. The supported range is from 0 to 7. The default value is 5.

5.2 Messages Autosplit

Autosplit: the range supported is from 0 to 3. It controls how messages longer then 160 chars are splitted:

0: Disabled

1: Enabled, no part-number

2: Enabled, text numbers

3: Enabled, concatenated format (not supported by some phones)

Blocktime: if the modem hags, it sleeps fo the time specified (in seconds).

errorsleeptime: if an ERORR occured, the modem sleeps for the time specified (in seconds).

5.3 How to enable WHITE/BLACK list

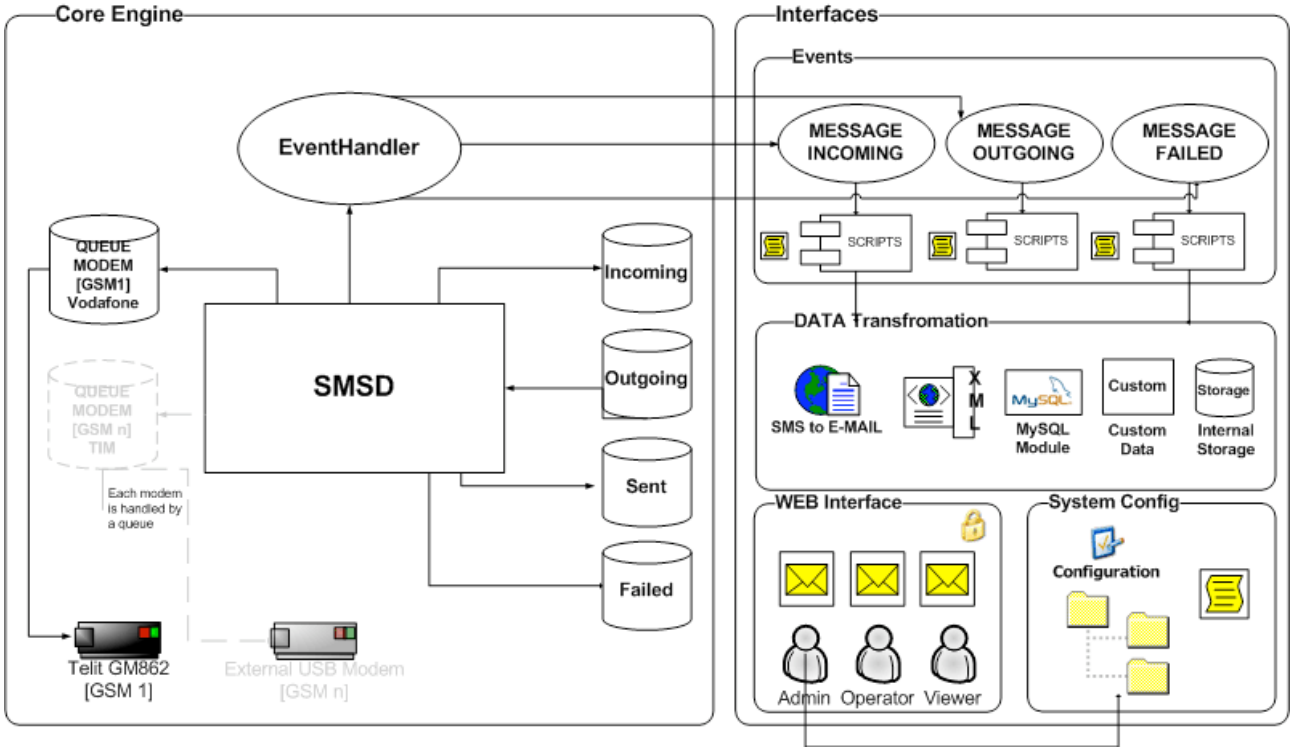
Blacklist= <PATH TO THE LIST>
Whitelist= <PATH TO THE LIST>
This enables Whitelists and Blacklists. Please remove comments as described in (Rif 2.1.2 Black/White list)

5.4 Setup of the PIN code of the SIM

#pin = 0000 remove the sharp # and put you SIM PIN to enable the security code check (this can slow down receiving speed).

6.0 Software functions draft

Software functions draft



SMS FoxBox's software consists on two main contests:

1. Core engine: this is the BASE system that handles all background processes, event handler and interaction between OS and the MODEM.
   The core engine uses GSM 07.05 (=ETSI TS 300 585) and GSM 03.38 (=ETSI TS 100 900) specifications.
2. User interface: it is completely WEB BASED, as described in the first chapter. You have to use a browser with XSL parsing capabilities. For a best use we suggest you Mozilla Firefox available on http://www.mozilla.com